Space Weather Forecast

Issued on Sunday, 08 January 2023 at 00:47 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate solar activity likely, slight chance of Strong solar activity throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Moderate, with a Moderate-class flare at 07/0053 UTC originating from the largest and most complex region on the visible disc. This region appears to be showing a couple of small 'delta' spots (opposite magnetic polarity within the same penumbra), now it has become more clearly visible. There are four other sunspot regions on the visible disc, of which the region near south centre disc is the next largest. It has grown in the last 24 hours, with an increase in penumbral area which may develop into a delta spot although it doesn't quite appear to be a delta just yet. The region in the southwest is smaller than these two regions, but does have some minor magnetic complexity. There are two further regions, one of which appears fairly stable and the other is fading. No Earth-directed Coronal Mass Ejections (CMEs) have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds showed signs of a waning coronal hole fast wind. Wind speeds were at slightly elevated levels, but declined slightly from around 470 km/s to near 430 km/s. Total Interplanetary Magnetic Field was mostly weak, with the north-south component also varying weakly. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is likely to be Low to Moderate, with a slight chance of becoming High from any Strong flares through the forecast period, these most likely from the largest region on the disc.

Solar Wind / Geomagnetic Activity: No Earth directed CMEs are currently expected. Solar wind speeds are slightly elevated at the moment, and are expected to continue to decline through Day 1 and into Day 2 (08-09 Jan), probably to near background levels. The next feature of interest is another coronal hole fast wind, which is likely to arrive either at the end of Day 2, or more likely on Day 3 (10 Jan). Geomagnetic activity is expected to be mostly Quiet to Unsettled at first, increasing with the fast wind arrival either later on Day 2 or on Day 3 to become Unsettled to Active, with a slight chance of a G1/Minor Storm. Activity then slowly declining through Day 4 (11 Jan).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a risk of an increase should any significant flares occur, giving a slight chance of exceeding the S1/Minor Storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	20	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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